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## A.D. 1879, *21st January.* N° 255.

### Manufacture of Beer, &c.

LETTERS PATENT to William Lloyd Wise, of Chandos Chambers, Adelphi, in the County of Middlesex, for the Invention of "IMPROVEMENTS IN THE MANUFACTURE OF BEER, WHICH IMPROVEMENTS IN PART RELATE TO THE PRODUCTION OF AN IMPROVED YEAST OR SUBSTANCE APPLICABLE TO OTHER PURPOSES WHERE FERMENTATION IS REQUIRED." A communication from abroad by Justin Dromel, of 15, Rue des Halles, Paris, France.

Sealed the 15th July 1879, and dated the 21st January 1879.

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PROVISIONAL SPECIFICATION left by the said William Lloyd Wise at the Office of the Commissioners of Patents on the 21st January 1879.

WILLIAM LLOYD WISE, of Chandos Chambers, Adelphi, in the County of Middlesex. "IMPROVEMENTS IN THE MANUFACTURE OF BEER, WHICH IMPROVEMENTS IN PART RELATE TO THE PRODUCTION OF AN IMPROVED YEAST OR SUBSTANCE APPLICABLE TO OTHER PURPOSES WHERE FERMENTATION IS REQUIRED." (A communication from abroad by Justin Dromel, of 15, Rue des Halles, Paris, France.)

This Invention has for object improvements in the manufacture of beer, which improvements in part relate to the production of an improved yeast or substance applicable to other purposes where fermentation is required.

A concentrated wort of beer is obtained capable of being stored without being liable to fermentation, and when required (by the addition of the hereinafter described improved ferment, which is likewise capable of being stored without deterioration) converted into potable beer, having the aroma, taste, and other qualities of a beer of the same class or corresponding quality.

The primary operations are analogous to those of ordinary beer brewing, according to the customs obtaining in different localities, with this important difference, that with a view to ulterior evaporation the same wort is used for two or more successive mashings, and only about one half the usual quantity of water is employed. Thus a wort of beer is obtained, which instead of registering 14° to 15° registers 28° to 30° of the saccharometer. A larger quantity of hops than usual is added, sometimes as much as double the quantity.

As soon as the wort, after having been run into the coolers, is cooled down to a suitable temperature for the purpose, it is filtered through flannel or other suitable medium in order to get a perfectly clear liquid. No foreign fermentable matter is introduced into the concentrated wort.

The wort having been filtered is conveyed to a vacuum evaporating pan, where it is submitted to evaporation at a low temperature not exceeding 50° centigrade. This pan is heated by a "close" steam worm with or without a double bottom.

The condense water produced by the evaporation is collected by a condenser. It may be returned to the mash tun or to the boiler for the purpose of subsequent brewings.

The degree of concentration can be advanced to any desired point; thus, in the case of the products which have not to be transported an excessive distance, it is stopped at the point where the syrup-meter marks 40°, which gives about 25 kilogrammes of concentration per 100 litres of liquid beer.

For products destined for exportation to distant parts the evaporation is pushed until the syrup meter marks 44°, which corresponds to a reduction of $^4/_5$ of the first volume, or to 20 kilogrammes of concentration per 100 litres of liquid beer. The concentration may even be carried so far as to attain a solid concentration, but it is preferable to stop at the pasty state, shewing 44° by the syrup-meter.

When the desired degree of concentration has been attained atmospheric air is caused to enter the evaporating pan, then a large way cock (or a valve) is opened and heat applied; the pasty concentration is caused to run off into metallic or other boxes, which must be perfectly tight and impermeable to air.

The concentrated wort thus obtained may be preserved almost indefinitely even in the hottest countries. After arrival at destination, and to convert it into potable beer, there must first be added the necessary quantity of water, according to the strength of beer required, and in addition a ferment capable of developing the fermentation.

For this purpose is required an imputrescible and unalterable ferment, which may be sent with the wort endowed with equally preservative qualities, and such that in continuous manufacture the fresh yeast of the preceding brewing may without inconvenience be employed in lieu of the improved generating ferment.

This ferment, which constitutes a leading feature of the Invention, consists of yeast of beer prepared as follows:—

100 kilos. of virgin yeast in the viscous state, having been collected and pressed or filtered so as to reduce it by thickening it to about 70 kilos., that is, to a consistency usual in commerce, it is thrown into a salt bath containing about 2 kilos. of marine salt per from 20 to 30 litres of water, and agitated rapidly; after which it is decanted, leaving the impurities deposited at the bottom of the vessel.

The yeast thus rapidly washed, and in a more liquid state than previously, is filtered in special filters through flannel or otherwise in order to carry off the saline solution; then it is thrown into a fresh bath prepared with tannic acid, so as to register 10° to 12°.

The incorporation of from 3 to 4 litres of this tannic acid solution suffices for this first treatment (with tannic acid), thoroughly mixing, filtering successively through flannel of single, double, or triple thickness, or otherwise extracting about $^2/_3$ of the incorporated tannic solution to complete this first washing.

Having thus obtained this yeast successively salted, treated with tannic acid and filtered, it is poured into a new bath composed of $^1/_3$ of tannic acid solution similar to the foregoing, and $^2/_3$ of a sufficiently diluted alcoholic solution.

After mixing afresh, and allowing a repose of from 4 to 6 hours, the yeast is poured on a filter as before, taking care in case of the filtration having to last a long time not to allow the temperature to rise above 10° centigrade.

After the yeast has settled and become by draining sufficiently pasty it is spread on a wooden plank or sheet of card-board, or better, on a screen of any galvanized metal, and as soon as it has reached a sufficient degree of plasticity to allow of its being kneaded sufficiently, it is conveyed to a sieve through which it is lightly pressed by the hand provided with a leather glove or a wooden stirrer.

In this manner is obtained a substance divided into a granular state, which is dried uniformly and rapidly by a current of air at 25° or 30°, after which it is hermetically enclosed so as to exclude air.

By the above mentioned process a practically unalterable imputrescible ferment is formed from good ordinary brewers' yeast.

It is to be understood that so far yeast for high fermentation suitable for highly fermented beer has been referred to, but for yeast for low fermentation, which however is rarely required, the treatment is the same except as respects the greater care necessary in the washing in the first bath.

From the foregoing description it will be understood that according to this Invention two products are obtained, whereby at any time and in any place fresh beer may be rapidly produced, which shall be of the quality desired.

The improved yeast may be used for the fermentation of other products, which like the worts of beer are fermentable.

In the foregoing description the strengths, temperatures, and other details are given approximately to explain the nature of the Invention.

SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said William Lloyd Wise in the Great Seal Patent Office on the 21st July 1879.

William Lloyd Wise, now of 7, Whitehall Place, in the City of Westminster, late of Chandos Chambers, Adelphi, in the County of Middlesex. "Improvements in the Manufacture of Beer, which Improvements in Part Relate to the Production of an Improved Yeast or Substance Applicable to other Purposes where Fermentation is Required." (A communication from abroad by Justin Dromel, of 15, Rue des Halles, Paris, France).

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A concentrated wort of beer is obtained capable of being stored without being liable to fermentation, and when required (by the addition of the hereinafter described improved ferment, which is likewise capable of being stored without deterioration) converted into potable beer, having the aroma, taste, and other qualities of a beer of the same class or corresponding quality as usually made.

The primary operations are analagous to those of ordinary beer brewing according to the customs obtaining in different localities, with this important difference, that with a view to ulterior evaporation the same wort is used for two or more successive mashings, and only about one half the usual quantity of water is employed. Thus a wort of beer is obtained, which instead of registering 14° to 15° registers 28° to 30° of the saccharometer. A larger quantity of hops than usual is added, up to as much as double the quantity. As soon as the wort, after having been conveyed to the coolers, is cooled down to a suitable temperature for the purpose, it is filtered through flannel or other suitable medium in order to get a perfectly clear liquid. This filtration is considered an important feature. No foreign fermentable sugar is introduced into the concentrated wort. The wort having been filtered is conveyed to a vacuum evaporating pan where it is submitted to evaporation at a low temperature not exceeding 50° centigrade. This pan is heated by a "close" steam worm with or without a double bottom.

The condense water produced by the evaporation is collected in a refrigerating apparatus (*une colonne rafraichissante*). It may be returned to the mash tun or to the boiler for the purpose of subsequent brewings.

The degree of concentration can be advanced to any desired point. Thus, in the case of the products which have not to be transported an excessive distance (*trop au loin*), it is stopped at the point where the syrup-meter registers 40°, which gives about 25 kilog. of concentration per 100 litres of liquid beer.

For products destined for exportation to distant parts the evaporation is pushed until the syrup-meter registers 44°, which corresponds to a reduction of four fifths of the first volume or to 20 kilog. of concentration per 100 litres of liquid beer. The concentration may even be carried so far as to obtain a solid concentration, but it is preferable to stop at the pasty state shewing 44° by the syrup-meter.

When the desired degree of concentration has been attained atmospheric air is caused to enter the evaporating pan, then a large way cock (or a valve) is opened and heat applied; the pasty concentration is caused to run off into metallic or other boxes or vessels, which must be perfectly tight and impermeable to air.

The concentrated wort thus obtained may be preserved almost indefinitely even in the hottest countries. After arrival at destination, and to convert it into potable beer, there must first be added the necessary quantity of water according to the strength of beer required, and in addition a ferment capable of developing the fermentation.

For this purpose is required an imputrescible and inalterable ferment which may be sent with the wort endowed with equally preservative qualities, and such that in continuous manufacture the fresh yeast of the preceding brewing may without inconvenience be employed in lieu of the improved generating ferment.

This ferment, which constitutes a leading feature of the Invention, consists of yeast of beer prepared as follows:—

100 kilos. of virgin yeast in the viscous state, having been collected and pressed or filtered so as to reduce it by thickening it to about 70 kilos, that is, to a consistency usually delivered in breweries, it is thrown into a salt bath containing about 2 kilos. of marine salt per from 20 to 30 litres of water, and agitated rapidly, after which it is decanted, leaving the impurities deposited at the bottom of the vessel.

The yeast thus rapidly washed, and in a more liquid state than previously, is filtered in special filters through flannel or otherwise in order to carry off the saline solution; then it is thrown into a fresh bath prepared with tannic acid (tannin) and registering 10° to 12°.

The incorporation of from 3 to 4 litres of this tannic acid solution (solution tannique) suffices for this first treatment (with tannic acid), which is terminated after thoroughly mixing by filtering successively through flannel of single, double, or triple thickness or otherwise, thus extracting about two thirds of the incorporated tannic solution. Having thus obtained this yeast successively salted, treated with tannic acid (tannée) and filtered, it is poured into a new bath composed of one third of tannic acid solution similar to the foregoing and two thirds of a sufficiently diluted alcoholic solution.

After mixing afresh and allowing a repose of from four to six hours the yeast is poured on a filter as before, taking care (by the application of some means of refrigeration) in case of the filtration having to last a long time, not to allow the temperature to rise above 10° centigrade.

After the yeast has settled and become by draining sufficiently pasty it is spread on a wooden plank or sheet of cardboard, or better, on a screen of any galvanised metal, and as soon as it has reached a sufficient degree of plasticity to allow of its being suitably kneaded it is conveyed to a sieve, through which it is lightly pressed by the hands provided with a leather glove or a wooden stirrer.

In this manner a substance is obtained divided into a granular state, which is dried uniformly and rapidly by a current of air at 25° or 30°, after which it is hermetically enclosed so as to exclude air.

By the abovementioned process a practically unalterable imputrescible ferment is formed from good ordinary brewers' yeast.

It is to be understood that so far yeast for high fermentation suitable for highly fermented beer has been referred to, but for yeast for low fermentation, which however is rarely required, the treatment is the same except as respects the greater care necessary in the washing in the first bath.

From the foregoing description it will be understood that according to this Invention two products are obtained, whereby at any time and in any place fresh beer may be rapidly produced which shall be of the quality desired.

The improved yeast may be used for the fermentation of other products, which like the worts of beer are fermentable.

Having described the nature of the said Invention, and explained in what manner the same is to be or may be performed or carried into effect, as communicated to me as aforesaid, I hereby declare that what I consider to be novel and original and therefore claim as secured to me under the Letters Patent hereinbefore in part recited is,—

1. The manufacture or production of concentrated wort, substantially as herein before described.

2. The method, substantially as hereinbefore described, of concentrating the filtered wort and collecting the products of distillation for utilisation by the use of a vacuum evaporating pan with application of heat distilling and cooling.

3. The manufacture or production of the new or improved ferment, substantially as hereinbefore described, and its application and use as above set forth.

In witness whereof, I, the said William Lloyd Wise, have hereunto set my hand and seal, this Eighteenth day of July, in the year of our Lord One thousand eight hundred and seventy nine.

W. LLOYD WISE. (L.S.)

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LONDON: Printed by George Edward Eyre and William Spottiswoode,
Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.

1879.

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EVERAGES

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1879

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The primary operations are analogous to those of ordinary beer brewing, according to the customs obtaining in different localities, with this important difference, that with a view to ulterior evaporation the same wort is used for two or more successive mashings, and only about one half the usual quantity of water is employed. Thus a wort of beer is obtained, which instead of registering 14° to 15° registers 28° to 30° of the saccharometer. A larger quantity of hops than usual is added, sometimes as much as double the quantity.

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The incorporation of from 3 to 4 litres of this tannic acid solution suffices for this first treatment (with tannic acid), thoroughly mixing, filtering successively through flannel of single, double, or triple thickness, or otherwise extracting about $^{2}/_{3}$ of the incorporated tannic solution to complete this first washing.

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2. The method, substantially as hereinbefore described, of concentrating the filtered wort and collecting the products of distillation for utilisation by the use of a vacuum evaporating pan with application of heat distilling and cooling.

3. The manufacture or production of the new or improved ferment, substantially as hereinbefore described, and its application and use as above set forth.

In witness whereof, I, the said William Lloyd Wise, have hereunto set my hand and seal, this Eighteenth day of July, in the year of our Lord One thousand eight hundred and seventy nine.

W. LLOYD WISE. (L.S.)

LONDON: Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
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